TEKNOLOGISK INSTITUT

Optimising fish product quality by effective detection of nematodes

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INTRODUCTION

Presence of nematodes in fish are an increasing challenge. Nematodes can infect humans who consume fresh fish and insufficiently processed fish products, thereby causing serious illness.

Today, visible nematodes are detected by passing the fillets over a light table and removed by manually trimming with a knife. This allows food safety risks from inadequate removal of hidden nematodes and can cause unnecessary food waste due to trimming off too much fish meat.

In marinated herrings, 15% of fillets are lost due to shrinking during storage in a salt and acetic acid brine, which is used to achieve a complete nematode killing. The presence of nematodes thus represents both a considerable loss of resources and a food safety risk.

AIM

To develop an industry-usable rapid method for automatic detection of nematodes, with detection similar or above the rate achieved by inspection on light table.

METHOD

Data on variations in host-parasite relationships form the basis for selection among the following technologies:

- RGB-based methods
- NIR hyperspectral vision
- UV fluorescence
- X-ray and DEXA scanning
- Computed Tomography (CT)

- The preliminary results indicates a beneficial merge of different modalities: Images generated with UV fluorescence and visible light to optimize sensitivity and selectivity.
- The detectability with computed tomography is not reflected in X-Ray radiography
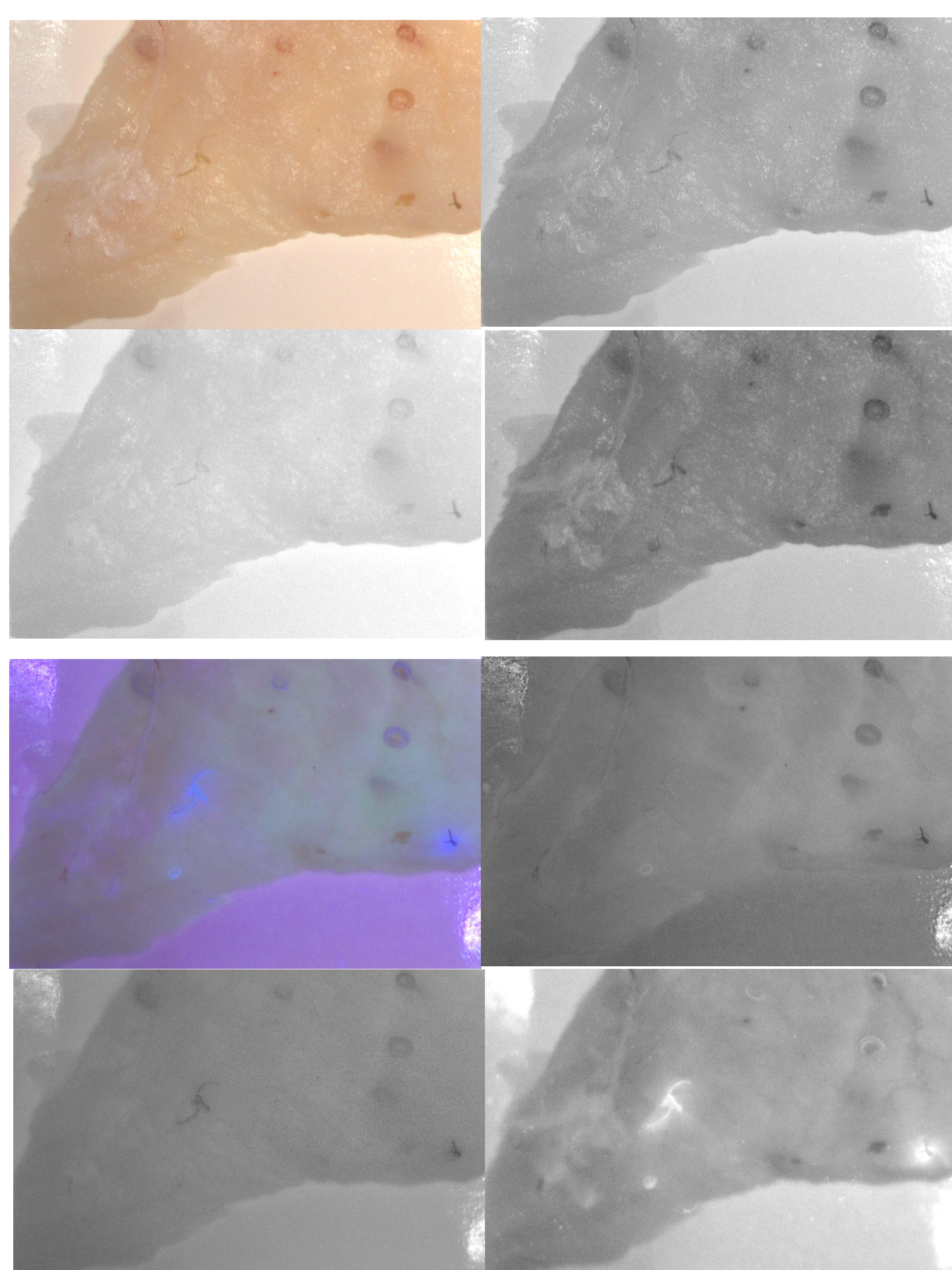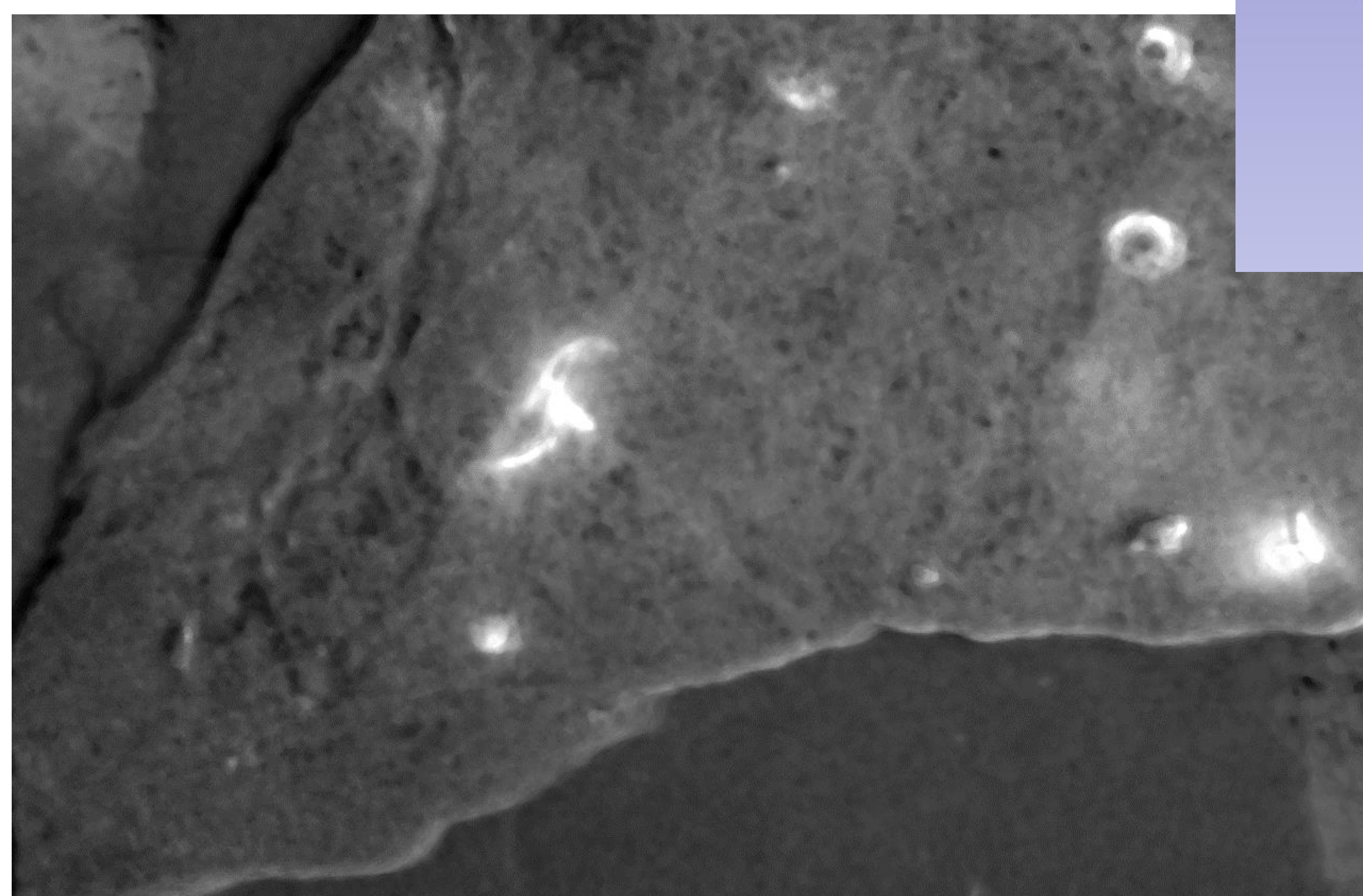
RESULTS

Figure 1: Top quartet shows the visible illumination separated in Red, Green and Blue channels. Bottom quartet shows the UV (365nm) image separated in Red, Green and Blue channels.

Figure 2: Top right is a CT scanning showing high sensitivity of nematode detection, a sensitivity that is not available in radiography. Bottom left show a preliminary result of a merge of visible light and UV fluorescence